

DOCUMENT RESUME

ED 193 207

SP 016 815

AUTHOR Johanningsmeier, Erwin V., Ed.; Merritt, James, Ed.
 TITLE Science of Education and the Education Professoriate.
 Occasional Papers Series--Set No. 10.
 INSTITUTION Northern Illinois Univ., De Kalb. Coll. of
 Education.; Society of Professors of Education,
 Washington, D.C.
 PUB DATE 78
 NOTE 59p.
 EDRS PRICE MF01/PC03 Plus Postage.
 DESCRIPTORS *Educational Anthropology; *Educational Change;
 *Educational History; Educational Needs; *Educational
 Philosophy; Educational Principles; Futures (of
 Society); Higher Education; Program Development;
 *Teacher Education; Teacher Educators

ABSTRACT

Historical essays examine the characteristics of the education professoriate and its quest for a science of education. The first paper shows how the expansion of public schooling in the early nineteenth century prompted school personnel to look for a science of education in order to improve their practice and schools, and to gain recognition for the evolving education professional group. The next paper outlines the work of Michael Vincent O'Shea, who worked diligently to gain respect for teacher education on the university campus. Charles Judd, who helped to build an outstanding School of Education at the University of Chicago, is the subject of the third paper. The last essay summarizes the underlying concepts and goals in the other papers and indicates future tasks for the education professoriate. Most important among these is an increased reliance on qualitative information, based on observation and experience. This sort of information can provide insight which is "scientific" and just as valuable as quantitative research. (CJ)

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OCCASIONAL PAPERS

SP 016 815

SCIENCE OF EDUCATION
AND
THE EDUCATION PROFESSORiate

Three Historical Studies--
Erwin Johanningmeier, Editor

Introduction and Commentary--
James Merritt, General Editor

Occasional Papers Series -- Set #10
Society of Professors of Education

Published at College of Education (Graham Hall 423)
Northern Illinois University
DeKalb, Illinois 60115

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Introduction

In designating these three historical essays as Set Number 10 in the Occasional Paper Series of the Society of Professors of Education we recognize a form of continuity which the SPE has achieved with the noteworthy publications program which Ayers Bagley had fostered over more than a decade. The yeoman labors which Ayers gave to the Society have been characterized by his highly imaginative perspectives on the vital functions which the SPE should serve in striving to upgrade the professoriate. To bring in a personal note, I was deeply impressed in 1976 when he told the Executive Board that publication for the Society was for him no less than a religion. This is to salute him for his magnificent contributions!

Manifestly, his act has been a hard one to follow--especially evident by the SPE Board's decision to divide publications work among several members. It has become my role to follow up on the papers presented at the 1977 Annual Meeting. God willing, other publications following this one shall appear in due course.

Considering the topic of this particular volume, the more I pondered the splendid productions of "Erv Johanningmeier's historians" contained here, the more I became convinced that there should be a special effort to elicit critical follow-up on their work. The topic of "science of--or in or for--education" is too vast to be definitively covered by these three excellent essays. 'Science' and 'scientific method' (and related terms such as 'experiment' and even 'experimentalism') are words which loom large in the language of education professors. Moreover, simplified versions of "the scientific method"--often equated with the steps of problem solving have constituted familiar content in education courses. To mention just one question, might not historians enlighten us on how such simplistic versions became so popular?

Another curiosity: Is there significant history on the impact--or lack of such--of the philosophy of science on the professoriate? One can logically argue that mastery of philosophy of science should be a general requirement in the education of educators. But the "power brokers" in professional education have hardly been as objectively detached as Plato's philosopher-kings. Possibly, historians can instruct us in this area.

A third curiosity which appears worthy of mention here is the "confrontation/avoidance patterns" which marked the relationships between the existentialist and the "hard science" investigators for teacher education. Why has there not been a better cross-fertilization between these two schools of investigators? Possibly, such conflict is to be judged as too much upon us to encourage historical effort. But in time the history must come, and there is no harm in hoping for an early breakthrough.

Hopefully, there shall be various, if not many, readers of these essays who shall recommend the priority topics for further historical work. The commentary which I append to these studies is largely of a polemical nature. It is my view that the SPE should sponsor both solidly academic writings and "reasoned polemics". The readers must judge whether my writings meet the latter criterion. If the professoriate is to be upgraded significantly, I believe, it shall largely be because of wise political decisions. And we can hope that good polemics shall lead to wise politics. We can, therefore, ask: What are the political ramifications (if any) of the concept of science of education for the professoriate in general and the SPE in particular? I have just been told that one of my students has met all requirements for the degree of Master of Science in Education, but I doubt very much that he has "adequate mastery" over science in education--much as I respect his sophistication in general. Should we not make a case for 'science of education' enjoying comparable lexical status with such "in" concepts as 'learning theory' and 'value clarification'?

Either 'science of education' is to be viewed essentially as an anachronism or a viable concept in our ongoing efforts to upgrade the professoriate. Or is there a significant middle ground? The Society invites either or both your scholarly or your polemical responses to the writings in this volume--or any type you find appropriate.

--J.M.

FOREWORD

THE EDUCATION PROFESSORiate
AND THE SCIENCE OF EDUCATION

Erwin V. Johanningmeier

University of South Florida

Recent meetings of the Society of Professors of Education have devoted considerable attention to the characteristics of the education professoriate. The papers which follow pursue that topic by exploring the relationship between the education professoriate and the quest for a science of education. They are revisions of papers which were delivered at the 1977 meeting of the Society in Chicago.

The first paper by James R. Robarts shows that the quest for a science of education began very early in the nineteenth century, long before there was even the beginning of an education professoriate. Robarts shows how the expansion of public schooling prompted school people to look for a science of education in order to improve their practice, their schools, and to gain the recognition for what was then an embryonic professional group. The following two papers show the diversity that was to be found in the fast growing profession in the early twentieth century.

Alfred G. Tufano's paper is an account of the work of Michael Vincent O'Shea. O'Shea worked diligently to gain respect for teacher education on the university campus. O'Shea can be considered as an example of a very early member of the education professoriate. Unlike many who were to follow him, he did not complete a doctorate in either

psychology or the new field of education. However, that did not prohibit him from contributing to the improvement of teacher education; nor did it deter him from raising important questions about the science of education. His work raises an important question: should education construct its own theories or derive them from allied fields?

The final paper is by Alanson Van Fleet. It is an account of the work of Charles Judd who helped to build an outstanding School of Education at the University of Chicago. Judd's background and career were very different from that of O'Shea. Judd was among the first to journey to Europe to study with the great psychologist Wundt. Judd worked to place the study of education and the training of teachers on a scientific basis during a period when the schools were experiencing a remarkable growth. As Van Fleet points out, about seven percent of the high school aged youth were in school when Judd began his career. When Judd retired, that seven percent had increased to seventy-five percent.

Collectively, these papers tell us not only about our past but also about the problems we continue to encounter. We trust the members of the Society and others will find them useful in gaining a perspective on our work and in clarifying some of the issues we face.

THE EDUCATIONAL PROFESSORiate
AND THE QUEST FOR A SCIENCE OF EDUCATION

James R. Robarts

Florida State University

The long quest for a science of education, it seems to me, can be correctly viewed as one important chapter in the history of the educational professoriate in America. As a matter of fact, the quest for a science of education predates the establishment of the profession. Long before there were any professors of education or teacher training institutions there were men interested in the development of the art and science of education. As far as I can determine, the science of education was being discussed as early as the 1820's.

Among the many problems faced by professional educators, and I take the normal school teachers as being the first of our breed, was professional recognition--status and legitimacy in the eyes of the general public and college faculties. A second problem was that of improving the work of the public schools. A third problem which became critical with the development of trained school administrators was lay interference in the operation of the public schools. This was a problem for professors of education since the lack of trust in these trained school administrators and their theories reflected adversely on those who had taught them. The quest for a science of education was motivated by a strong desire to solve these three problems.

A well developed science of education would, so educators thought and hoped down through the years, bring respect, recognition and status to their profession, dramatically improve the effectiveness of the public schools, and end, once and for all, lay interference in the operation of the schools. If educators had the status and prestige of doctors what layman would be so bold as to tell educators how to run the schools: At times some educators seemed to believe that some of their aims could be achieved if they could just convince the public that they really did know what they were about. This follows a rather common American belief that many problems can best be dealt with through a good public relations job.

Educational historians have correctly identified the scientific movement in education, which occurred in the first decades of this century, as the period in which the quest for the science was most concentrated and intense. This view, however, ignores the fact that the quest had been underway since the early decades of the previous century and even though the nature of the science and the methodologies used to develop it were different from the previous century, there are a number of similarities between the two phases of the movement. It may well be true that the three problems previously identified--professional recognition, improvement of the schools and an end to lay interference were more critical and pressing in the twentieth century than in the nineteenth because of the sheer growth of the enterprise, if nothing else.

The similarities between the two phases (i.e. the 19th and the 20th centuries) of the movement are rather striking and lend some credence to the idea that educational problems are never really solved; they are only talked about endlessly. In both phases educational leaders continuously declared that education was or could be a science, that it deserved the recognition and status of the other sciences, and were puzzled and sometimes hurt that college people and the general public were so perverse in their refusal to accord educators the recognition due them. Frequent fits of doubt and despair about the status of the science occurred in both phases. There were also resorts to questionnaires and select committees to reassure educators that education was a science and worthy of being taught. Finally, the need for a science of education, its status, and nature were discussed frequently in both phases and largely in the same terms.

Some of the earliest recorded discussions of the science are to be found in the proceedings of the American Institute of Instruction in the 1830s. Audiences at the

meetings of this organization were told that the science of education was the basis of all human progress and all other sciences; that it was a distinct science with its own subject matter, objectives and laws; and its fullest development was urgently needed to cure the deplorable state of the common schools. One speaker asked, "Is there anything being done in this community for supplying these deficiencies (in the common schools) and for the elevation of the science and art of teaching to its true rank, that of a profession?"²

The establishment of normal schools, beginning in the 1830s; lent additional urgency to the quest for an educational science. Normal schools had been established on the assumption that there was or could be a science of education, that it could be taught to teachers, and that it would improve their effectiveness in the schools. Normal schools were often established in the face of considerable doubt and some hostility. The hostility came from taxpayers and from college faculties who claimed that they had traditionally trained teachers. There was widespread doubt that anything could be profitably taught to teachers other than the subject matter they were to teach. Not many believed that there was a science of education. Consequently, normal school people, from the very beginning, felt besieged and compelled to justify their existence. I would guess that this was the beginning of the sense of inferiority that has plagued the profession until today. They felt especially inferior when they compared themselves with college professors. Further, they had to be careful not to be accused of duplicating the work of either the colleges or the secondary schools as this would render them superfluous. As a matter of fact they were doing work of a secondary or lower level with the addition of some professional work. They longed for the day when they could require a bachelor's degree for admission and restrict themselves to graduate level, purely professional training. Many students apparently attended them because a high school or academy was not available. Normal school leaders were still complaining about the neglect and contempt they suffered as late as 1902.³

An obvious solution to their problems was to develop a science of education and demonstrate that the teachers who had studied it were more effective than those who had not. Normal school leaders utilized several strategies. They taught numerous courses titled, "Science of Education" wrote many books with that or a similar title and, more than anything else discussed the topic in the meetings of the American Normal School Association. John Ogden, a normal school principal, warned the members in 1859, "We cannot afford to be forever debating the question whether there is

or is not a science of education; whether there is or is not a need for normal schools." Ogden was convinced that the correct answer to both questions was yes.⁴

In 1857, the National Teachers Association was founded and provided an enlarged forum for the discussions of the science. At the organizational meeting William Russell, an educational journalist, proclaimed, "Education is now being studied both as a science and an art."⁵ Richard Edwards, addressing the group in 1865, argued that one of the distinct characteristics of the normal school was that it imparted instruction in the Science of Education and the Art of Teaching. Edwards admitted there was one segment of the public who regarded the whole matter as a sort of well-intentioned imposture and that some of the apostles of the science had exhibited more zeal than knowledge. He concluded by saying, "But it is not, I trust, necessary at this late date, to assure that there is here as noble a science as ever engaged the thoughts of men. There are immutable principles here that ought to be studied and comprehended by every young person entering upon the work of teaching."⁶ But it was necessary for educators to give such assurances not only in 1865 but also in 1875, 1885, 1895 and even as late as the 1930s. The public appeared extremely hard to convince. It would take more than assurances from educators who obviously had a vested interest in it. Educators themselves, in the security of their own professional organizations, often expressed doubts about the current status of the science but almost never questioned the possibility of developing one. Such heresy could scarcely have been tolerated.

Richard Edwards, speaking again in 1873, lamented, "I know nothing more unsatisfactory in some aspects than the science of education in our days. There is just enough ascertained truth in it to serve as a basis for a vast amount of writing, speaking and generalizing and classifying that is unripe and has nothing to recommend it but its volubleness and assurance. We have been compelled to talk faster than we can think."⁷

A novel proposal was advanced in 1870 by J. C. Gilchrist. The awarding of degrees to teachers would make them qualified and willing to make scientific discoveries in education and such discoveries would receive favorable attention instead of the derision and neglect they had received in the past.⁸ Apparently Mr. Gilchrist thought a degree in and of itself would do the trick.

The questionnaire has a long, if somewhat dubious, place in education as a major tool for discovering truth. When nothing else seemed to prove that there was a science of

education, the Normal Department of the N.E.A. sent a questionnaire to thirty normal school principals in 1974. They were asked, "Do you regard education as a science sufficiently defined and established to warrant the adoption of a purely professional course in our normal schools?" The results were disappointingly indecisive. Seventeen of the principals replied "Yes," five "No," and seven could provide no answer.⁹ A similar questionnaire was reportedly used around 1930 and the results were again inconclusive.¹⁰ Still another approach was used in 1884 when the National Council of Education, an elite group of the N.E.A., was asked to provide definitive answers about the science. This group of leaders refused to elaborate on the science whose existence they affirmed.¹¹

Educators continued to discuss the science throughout the nineteenth century and well into the twentieth century. The emergence of the scientific movement in the early decades of this century predictably served to stimulate intense interest in the subject. Educators believed that they were at last on the right road--they were for the first time using genuine scientific methods and this time they could not fail to develop the science they had so long desired. This new science of education was, to be sure, different from the old one in that it was quantitatively and experimentally based--at least that was what everyone said. But, the topics of debates in journals and conventions were rather similar to those carried on about the old science. The major motivations remained practically the same--professional recognition, improvement of schools, and an end to lay interference. The latter was to become an especially acute issue since colleges and departments of education were turning out trained school administrators in increasing numbers.

What was the nature of this science of education about which so much was written and spoken? Here as in most areas of education there was considerable controversy. One controversy which developed very early was whether education was an autonomous science to be developed by educators using their own resources and attacking their own problems, or whether it was a derivative science like medicine and engineering which borrowed its fundamental laws from other sciences. Another was whether it was an inductive or deductive science or some combination of both.

Throughout most of the nineteenth century the term "science" meant simply an organized body of knowledge. Its source did not seem to be very significant. The term was as apt to be applied to law or theology as it was to the natural sciences. It was often used interchangeably with philosophy. One normal school leader defined it as "a body of facts and

principles so classified and organized as to present a clear outline or system."¹² To another writer it was "the general truths or principles upon which education proceeds,... duly classified and systematized."¹³ Absent until near the end of the century were ideas about quantification, prediction and control as being basic to its nature.

The approach most commonly used in the nineteenth century was highly derivative. Numerous disciplines were identified at one time or another as being basic to the science, but psychology, which purported to reveal the laws of mental development, was the discipline most often used to supply the basic laws. Educational rules could then be deduced from psychological laws and principles. The primary methodology, then was of a rationalistic, speculative, and deductive nature. The educational scientist of the nineteenth century was apt to be an armchair scholar who logically deduced educational rules and principles from the laws of mental development.

Probably one of the best descriptions of this method was given by William H. Payne, who had the distinction of holding the first chair of the art and science of education in an American university. Payne wrote, "Whoever takes an established psychological law and draws from it legitimate deductions that can be employed for guidance in educational work, has made a contribution to the science of pedagogics." He believed that careful deductions from three well established laws would rationalize nearly every process of the schoolroom. In case you are interested, these laws were "the descent of the mind from aggregates to elements; the mutual exclusion of thought and feelings; and progress from the confused to the definite."¹⁴

In 1889, Daniel Putnam, a professor of psychology and pedagogy wrote one of the last nineteenth century science of education texts, A Manual of Pedagogics. It used the deductive approach to the science: from each law of mental growth and development he deduced the appropriate laws of teaching. For example, he identified the first law of the mind as the law of apprehension and defined it: "The mind, at all periods of development, naturally grasps or receives the material of knowledge in the form of aggregates, wholes, or units, as far as this is possible." From this he deduced the first law of teaching or law of presentation: "The teacher should present the material of knowledge to the mind of the learner in the form of aggregates, wholes, or units, as far as possible."¹⁵ Putnam also included special laws which were supposed to enable the teacher to adapt the general laws to the various stages of mental development of individual students. How much

practical help a schoolteacher might receive from this kind of science I will leave to you.

A new era in the science of education began before the century was over. G. Stanley Hall came forth with child study and promised, among other things, a reconstruction of both child-rearing and childhood education that would bring them into agreement with the true nature of the child. At long last a true science of education would be developed based upon facts not upon speculation, tradition or an outworn psychology. He attempted to do this largely with the use of questionnaires. Child-study enjoyed tremendous professional and popular acclaim and enlisted thousands of people in the collection of facts. When it failed to deliver a true science of education its popularity waned rapidly.

Hall's insistence however, that a science of education must be based on facts provided one of the bases for the new science of education. The practice of having prospective teachers spend hours in classrooms studying real children may well have had its origins in Hall's ideas. The facts that Hall demanded for the new era of science were to be acquired through experimentation and were to be quantifiable. Educators now believed that quantification was the sine qua non of a science. Scientific became the new magic word in education and was indiscriminately applied to anything and everything including the science of educational janitorship. The quest continues today without the fanfare of yesteryear but the goal seems as elusive as ever.

NOTES

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2. Charles Brooks, "School Reforms or Teachers Seminars," Proceedings and Addresses, American Institute of Instruction, 1837, p. 174.
3. Homer H. Seerley, "Defects in Normal Schools that Are Responsible for the Opposition and Criticism Urged Against Them in Many Parts of the United States," Proceedings and Addresses, National Education Association, 1902, pp. 539-540.
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6. Richard Edwards, "Normal Schools in the United States," Proceedings and Addresses, National Teachers Association, 1865, pp. 531-532.
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10. Frank H. Freeman, "Scientific and Philosophic Methods in Education," Science, LXXIII, no. 1881 (January 16, 1931), p. 54.
11. George P. Brown, "Discussion of Mr. Harris's Paper," Proceedings and Addresses, National Education Association, 1884, p. 56.
12. John Ogden, "What Constitutes a Consistent Course of Study for Normal Schools?" Proceedings and Addresses, National Education Association, 1874, p. 219.

13. J. A. Reinhart, "The Inductive Element in the Science of Education," Education, II (November, 1881), p. 173.
14. William H. Payne, Contributions to the Science of Education (New York: Harper and Brothers, 1886, pp. 3-20.
15. Daniel Putnam, A Manual of Pedagogics, (Boston: Silver, Burdett and Company, 1899), pp. 38-47.

MICHAEL VINCENT O'SHEA, SCIENCE
AND THE EDUCATION PROFESSORiate

Alfred G. Tufano
Fairfield University

Michael Vincent O'Shea was a prominent figure in teacher education during the formative years of the education professoriate at the turn of the century.¹ He was well known especially for his efforts to gain respectability and status for the professor of education amidst opposition toward teacher education at the university. Up to the time of his death in 1932 he worked hard to develop an education curriculum with academic respectability. His programs at the normal school in Mankato, Minnesota and then at the University of Wisconsin in Madison based on a science of education proved to achieve this end, and they became models for other teacher education programs throughout the country.

Today, however, Michael Vincent O'Shea is not well remembered. His anonymity stands in sharp contrast to his popularity during his lifetime. He wrote some twenty-two books--all widely read both as textbooks in teacher education programs and as manuals on child nurture for parents. He was editor of ten periodicals on education--few remember that he was the creator and first editor of the still well-known World Book Encyclopedia. Numerous articles in professional journals and popular magazines added to his reputation as an authority on the science of education, and he was frequently requested to give lectures all over the United States and even in Europe.

O'Shea's current anonymity may be due to the fact that he was more the popularizer of the science of education than a theorizer. Also, others like G. Stanley Hall, may have talked about what a science of education implied for teacher training; O'Shea was a pioneer in the actual implementation.² Nevertheless, the importance of O'Shea's role in the reform of teacher education in terms of the eventual development of the education professoriate cannot be overestimated. He lay the groundwork for much of what characterizes teacher education and the education professoriate today.

It will be argued in this study that O'Shea was faced with a difficult situation of widespread teacher incompetence throughout the country and of open hostility toward professors of education on the part of many on the university faculty. In an age when science and technology were the ideal university study, his response to this opposition was the development of an education curriculum conforming to the model of training in the technological fields. This study will conclude with a discussion of the implications of O'Shea's ideology for the education professoriate today.

Education As Applied Science

Teacher training on the university level has always met with opposition. When liberal culture was the university ideal up until about the last quarter of the nineteenth century, opposition was voiced by the liberal arts professors. They objected that in pedagogy there was no subject matter to teach and little education literature of any worth to read.³ Teacher education in the normal schools was absolutely ridiculed as being nothing more than education in fads and frills.⁴ Professors of education, like William Payne at the University of Michigan, placated the liberal arts professors to some extent by developing a program with a philosophical orientation.⁵ Thus, teacher education involved the study of aims, curriculum theory and practice, the role of the teacher, the nature of mental processes, and teaching method--all following logically from the particular philosophical system espoused.

As long as liberal culture remained the ideal university study, professors of education with this philosophical orientation enjoyed some status in the university. But the ideal of liberal culture gradually lost its place of honor, and the conservative liberal arts professor, although always a force to be reckoned with, was no longer a voice of power on the university faculty. In his place stood the scientist and the professor of utilitarian fields.⁶ These latter objected that education lacked scientific rigour. Professors

of education who viewed teacher education as a philosophical study argued that their program was indeed scientific according to the traditional understanding of the word, that is, the idea of science as "systematic knowledge." But they met with new opposition with the development of a "new science"--the "scientific method" as it was called. Doing science now meant the derivation of principles of physical and social phenomena through inductive reasoning from a carefully detailed data base. The "new science" was quickly accepted as the only valid method of acquiring knowledge.

The scientific method, it is important to note, led to the proliferation of subject matter specialties--biology, psychology and sociology among many other. These specialties led to the development of corresponding applied science technologies, like engineering and architecture. The university appeared to have accommodated itself to the demands of an increasingly industrialized age, and, therefore, science and technology or utilitarianism became the ideal university education.

Pedagogical studies at the university, with their philosophical orientation, therefore, were an anomaly. In fact, their position was made even more precarious in view of the fact that the education offered was supposed to make teachers effective in their work in the schools, but the public was up in arms because of gross teacher incompetence. If they were not aware of the incompetence by personal experience, the studies on the public schools conducted by the dedicated physician, Joseph Mayer Rice, would provide ample evidence. These studies, an exposé of American educational practice, were published in a series of articles in The Forum during the last decade of the nineteenth century.⁷ The articles created a furor among university faculty and the public at large.

Rice studied school systems in thirty-six cities across the nation, attended school board meetings, visited classrooms, and interviewed hundreds of students, teachers, and parents. Among other things, he concluded that downright incompetence on the part of teachers was characteristic of the American schools. Rice declared that teacher training policy had been subjected to a "mass of philosophical opinion" and had become "waterlogged in a sea of opinions."⁸ He insisted that educational practice must be subjected to scientific inquiry. Rice was casting stones at the education profession when he wrote that "claim to recognition is not yet warranted by the status of pedagogy because...practical pedagogy is still lacking in that element of precision which is characteristic of the recognized sciences." He continues:

The broad questions involved in the teaching of the 3 R's are not one bit more complicated than the matter of medical diagnosis; and, by exercising the same care as the medical profession in the development of delicate devices for the study of the minutest details, educators will learn to differentiate pedagogical troubles, now so completely veiled in mystery.

Rice offered the challenge, and it was Michael Vincent O'Shea who played a dominant role in laying the foundations, at least, for the kind of teacher education he was calling for.

O'Shea had already made a name for himself as a "scientist" of sorts in the education professoriate. He was a leading figure in the Child Study Movement, which was launched by G. Stanley Hall in 1891. Like Hall, O'Shea saw the link between education and the new science in the method of child study. However, much criticism was directed at the Child Study Movement because of the sentimentality that frequently manifested itself in the discussions on children and the fact that the "science" was often "lacking in depth and persistence."¹⁰

A distinction was made between the "pure science" of child study and the applied science of child study. Hall's name was prominently associated with the former; O'Shea's name, with the latter. In fact, it was mainly through O'Shea's work and writings in child study that education was being widely accepted as applied science.

In view of O'Shea's reputation as a "scientist" of education, it is not surprising that his first book, Education As Adjustment, was well received.¹¹ The book was published in 1903 when the furor over the Rice studies was still fresh in people's minds, and it was a welcome response to the repeated calls at the National Education Association and in educational journals at the time for more scientific pedagogy. The main purpose of the book was to standardize the ends and means of education through the "scientific method." If aims of education, curriculum theory and practice, and teaching competence or methodology could be determined by "objective science", O'Shea argued, confusion in education would be eliminated. Education As Adjustment attempted to establish the theoretical basis for an objective science of education, and all of O'Shea's subsequent writings were the practical application in teaching and teacher education.

Taking as his premise that education is an applied science, O'Shea indicated that the data base for the educative

enterprise is supplied by the "foundation sciences", especially biology, psychology, and sociology. The scientific method of the foundation sciences, according to O'Shea, does away with "mere philosophical judgement" and is "the only way to get at truth."¹²

Many of O'Shea's contemporaries, it must be noted, considered the foundation sciences as the "liberal education sequence", and methods courses were the strictly professional sequence in the teacher education curriculum. O'Shea often argued in his earlier writings for the view that both the foundation courses and methods courses were the professional sequence, the former supplying the theoretical or scientific substructure for the latter. Subsequent developments in teacher education indicate that O'Shea's view prevailed for the most part.¹³

In promoting the idea of education as an applied science, O'Shea was developing the teacher education program according to the model of other applied sciences or technological fields. Therefore, the study of education, he insisted, was equal in rank to other studies at the university.¹⁴

As a pioneer in viewing education as a technical process, O'Shea may not have had the sophistication of scientific measurement to be developed later in scientific research, but he was providing the framework or direction at least for achieving the precision that Joseph Mayer Rice was calling for. The full impact of O'Shea's thinking, in fact, could be missed if not carefully analyzed. The key to this analysis lies in the very idea of technology or technique itself, and Jacques Ellul's insightful definition in his book The Technological Society is most useful in this regard. Generalizing from the use of technique in every aspect of the technological society, Ellul argues that technology is best described as "standardized means to achieve predetermined ends."¹⁵

In O'Shea's ideology, this study will show, not only is teaching technique; education itself is technique in the sense that Ellul uses the term. These ideas have important consequences for the subsequent development of the education professoriate.

Education As Technique

O'Shea's book, Education As Adjustment, is one of the earliest statements of education for social efficiency. The predetermined ends in this educational technology are the needs of the social structure. Thus, no subject matter can be justified in the curriculum, O'Shea and subsequent social efficiency educators would insist, unless it had practical

implication for adult life in terms of marketable skills or acceptable social behavior.

Consistent with his faith in the infallibility of the scientific method, O'Shea offers what he considered objective evidence for proof of his hypothesis that "the aim of education is adaptation to environment."¹⁶ For his data he uses research in biology, psychology and sociology. From biology he singles out research in evolution and the principle that life itself implies the power and necessity of adaptation. For the early O'Shea physiological psychology and genetic psychology, both of which viewed human behavior from a monistic or mechanistic point of view, is the only valid approach to a study of human behavior; the later O'Shea was committed to a behavioristic approach. "Objective psychology", O'Shea argued, "sees man as a reactive organism."¹⁷ Man, therefore, must adapt to his environment, for if his thoughts and feelings are in conflict with his environment, physical and mental dysfunctioning will be the result. O'Shea considered evidence in sociology as the most cogent proof for his hypothesis. "Sociologists", he insisted, "are in general agreement that there is no individual man...nor are there any feelings, thoughts, or volitions in any man which are independent of social forces."¹⁸ With the presentation of his "evidence" O'Shea felt he had proven the aim of education for social efficiency.

One of the assumptions in O'Shea's reasoning is the nature--is--right ideology espoused also by many of his contemporaries, William Torey Harris and G. Stanley Hall among others. Implied in this assumption is that the scientific method reveals the natural order of things and from the "is" a leap is made to the "ought." Critics pointed out that this view is naive, especially when the idea is applied to human values like the aims of education. But Hall, Harris, and O'Shea together with them, promoted the nature--is--right ideology based on a total commitment to evolutionary theory. This point is often missed in the criticism of the nature--is--right concept, although in the last analysis the idea presents several problems in the philosophy of science. The bridge in O'Shea's reasoning, for example, linking the "is" with the "ought" is research in biological and social evolution, especially in the thought of Herbert Spencer and Lester Frank Ward.¹⁹ Spencer reasoned that social progress necessarily takes place through evolutionary change. Ward went a step farther and argued the concept of "anthropo-teleology", the idea that man can assist nature in its evolution toward greater social progress according to his own chosen ends. In O'Shea's ideology, therefore, the social organism of his own time was the most perfect thus far in the evolutionary process.

Hence, a study of the physical and social order as it then existed would reveal the "ought" for a person to achieve happiness and fulfillment, if he would only insert himself into the socio-physical ecology.

Those charged with the work of anthropo-teleology, in O'Shea's view, always follow nature and never, because of selfish or revolutionary ends, thwart the progress toward perfection that is hinted at in nature although clouded over with imperfection. Only certain groups in society are capable of doing this, and O'Shea calls them "creator-artists", among whom are numbered teachers, politicians, scientists, and other professional groups. The creator-artists are endowed with a special wisdom whereby they use their "art" according to "science"; that is, they are able to improve the human condition, physically and socially, within their area of expertise. O'Shea's whole program of education as technique follows logically from this premise.

As a result of a web of interaction among members in the social organism, society in O'Shea's ideology is greater than the sum of its parts. It is a kind of mystical body, which can be hurt or benefitted by each of its members. Each and every member, therefore, must contribute in some way to the proper functioning of the whole social organism so that everyone can benefit from the socio-homeostasis according to their own particular needs. If anyone is deficient in his contribution, the goal of adaptation for everyone, to some degree at least, is frustrated. The whole organism, therefore, is a bureaucracy in which complete interdependence promotes social efficiency.

It is the unique role of the school, O'Shea declares, to promote this socio-ecological balance. "The school is in a true sense the servant of society, not its master," he writes.²⁰

The general blueprint for O'Shea's technology having been established, he proceeds to fill in the details. It is up to the school to identify the role each student is to play in the social organism. "It is possible to predict with considerable accuracy", O'Shea writes, "what kind of work, whether simple or complex, nine-tenths of the pupils in our schools will do."²¹ The criteria for determining probable destination are social status, family background, and intellectual aptitude. Once the probable destination is determined the school devises a curriculum for the pupil that would assure his insertion into the social organism.

Some students, O'Shea insisted, are destined for higher positions in the social organism, and these would require a

more thorough training for their role as creator-artists. Others are destined for a lesser role, nonetheless, he was quick to add, an essential role for the well-being of the social organism. It would be a waste of time, however, for these latter to study Shakespeare or advanced grammar. O'Shea then suggested a taxonomy of objectives for the education of various occupational fields in the social network--maximum proficiency for the blacksmith, for the bricklayer, and so forth in various subject matter fields. Anything above these standards, O'Shea insisted, would be a waste of time for the student as well as the teacher.

This, then, is the idea of education as technique. The predetermined ends are the specific needs of society to be met by the probable destination of each of its members. The standardized means is the differentiated curriculum. There remained the task in teacher education programs to train the technicians for this technology.

Teaching As Technology

The specific ends of the technology of teaching in O'Shea's ideology were carefully delineated in his curriculum for social efficiency. Consistent with his conviction that the foundation sciences provided the "objective" or scientific base for the educative enterprise, O'Shea saw the standardized means for teaching in principles of psychology. Among the numerous "schools" of psychology, he ruled out those based on a metaphysics of human behavior or an a priori approach; only those could lay claim to being scientific which held a mechanistic world-view. O'Shea thus assumed an eclectic approach espousing the genetic psychology of G. Stanley Hall, the physiological psychology of Edward Titchener, and the behavioristic psychology of Edward Thorndike. The principles of these psychologies provided the mechanics for the teacher-technician and, in O'Shea's view, eliminated human error in production for social efficiency. "When the aims and ends of education have been decided upon," he wrote, "(psychology) shows what are the simplest, most speedy, and most certain ways of attaining those ends."²²

William James, and other psychologists with him, objected to this approach in pedagogy. For example, the extensive use O'Shea and his contemporaries made of psychological research on fatigue, attention and association occasioned the following remark by James in his Talks To Teachers:

...you make a great, a very great mistake if you think that psychology, being the science of the

mind's laws, is something from which you can deduce definite programmes and schemes and methods of instruction for immediate classroom use. ...tact, interest, and sympathy...will be of much more value than those...pedantic elementary measurements of fatigue, memory, association, and attention, etc., which are urged upon us as the only basis of a genuinely scientific pedagogy.²³

Replying directly to James' remarks, O'Shea disagreed with him and insisted that the "universal laws" of psychology provided the teacher with "the best, the most efficient" methods of instruction.²⁴ While he agreed with James that teachers do not have the time to pursue the study of psychology in depth, he felt it was the function of the teacher educator to provide teachers with the "rules of pedagogy" deduced from psychology.

It was indeed in this capacity that O'Shea became the Dr. Spock of his own day in giving advice to teachers on the education of children and youth based on principles of psychology. The titles alone of his books indicate the practical nature of his treatment with little or no discussion of theory: Everyday Problems in Teaching, First Steps in Child Training, The Trend of the Teens.²⁵ These books make distinctive use of genetic and physiological psychology for the advice given. Social Development and Education and Mental Development and Education, two very popular texts in teacher training throughout the country, take a behavioristic approach predominantly and are a specific application of O'Shea's theoretical treatment of education as technology as outlined in his earlier work, Education As Adjustment.²⁶ In all his works O'Shea attempted to outline specific competencies necessary for effective teaching technology based on psychological research. Although much of his advice is somewhat naive according to modern standards, O'Shea's approach is significant for its pioneer attempts in competency-based teaching. Competency-based teaching is O'Shea's ideology carried to its limits. It is almost pure technology.

University Study of Education Triumphant

By the time of O'Shea's death in 1932 the education professoriate had come a long way since 1879 when the first chair of pedagogy was being proposed at the University of Michigan. At that time a university professor asked B.A. Hinsdale sarcastically, "What literature was there for such a professor to teach?"²⁷ By 1932 there were hundreds of books in the tradition of both the liberal arts and the "new science". Although many others surpassed him in their reputation as "scientists" of education, O'Shea himself was a profound influence

through his writings on subsequent developments in the technology of teaching and education.

Michael Vincent O'Shea and his contemporaries worked hard to gain equal status with other professors of scientific and utilitarian fields at the university. In O'Shea's case his efforts were rewarded in June 1930 when the "department" of education at the University of Wisconsin was given independent professional status as a School of Education. O'Shea wrote triumphantly:

The School of Education was given the status of a college because of the demand of many who rightly believe that the university should recognize teaching as a profession on an equal basis with engineering, law, and medicine.²⁸

The Education Professoriate Today

It is evident that the fundamental thrust of teacher education and the work of the education professoriate as they exist today have their roots in O'Shea's system. For example, current issues in ability grouping with curriculum differentiation; epistemological, political and ethical issues in the behavioral objective technique of curriculum development, and issues involved in teacher evaluation and accountability - all have their origins in the problems facing O'Shea and his contemporaries in the function of teacher education. These issues have been extensively debated in the education professoriate. When these issues are viewed from the historical perspective, however, broader, more fundamental issues are brought into sharp focus. If dealt with seriously, these latter issues can open up new and surprising paths for the education professoriate.

The first issue is the almost unchallenged domination since O'Shea's time of the so-called scientific method as the only credible mode of knowing. Michael W. Apple makes this point rather forcefully when he writes:

...'scientific' outlooks have become so ingrained in our consciousness that they have become values, not merely ways of gaining knowledge. Accepted ways of operating on and perceiving their fields in the scientific disciplines generally tend to act as normative commitments once they are accepted and have existed for a length of time. This phenomenon makes it very difficult for new ideas to gain acceptance.²⁹

Put aside the question of whether or not education is a science in its own right, and put aside the fact that there is considerable difference of opinion among behavioral scientists (upon whom educators have relied for their activity) over whether they should adopt a positivistic model for their research.³⁰ Nevertheless, it is crucial for educators to drop the idea of the scientific method as the only valid method of inquiry into what goes on in the classroom. The scientific method has failed to reveal what the schools ought to teach. In the final analysis, curriculum may be basically a question of values and needs-- both of which lie outside the realm of science as it is presently understood. As Boyd Bode so astutely recognized, "No scientific analysis known to man can determine the desirability or need of anything."³¹ It is important to note also that the persistent "no significant difference" in research on teaching methodology seems to indicate that the scientific method has not helped in discovering the standardized means for achieving curricular objectives, however they are determined. Different modes of enquiry must be utilized if any progress is to be made in promoting a viable educative enterprise.

It is worth noting in this connection that the work of the German philosopher, Jurgen Habermas, is most useful, among those which promote other modes of knowing, for opening up new paths for the education professoriate.³² Arguing rather convincingly that science is not neutral as we have supposed, Habermas indicates that knowledge is pursued according to certain "interests" or purposes or a particular worldview. Thus he distinguishes between strict science, hermeneutic science, and critical science. The interest of strict science is technology and control; the interest of hermeneutic science is not in control but rather in extending intersubjective understanding, and the interest of critical science, based on a humanized and reconstructed Marxism, is the emancipation of individuals from lawlike patterns of action in "nature" and in history.

The ideas of Habermas and other contemporary philosophers of science are opening up new ideas in all scientific disciplines and present a wide range of possibilities for the education professoriate.

The second broad issue apparent from the study of Michael Vincent O'Shea is related to the first. It has to do with the dubious validity of deriving theories of education and teaching from so-called foundation sciences. One of the problems involved is the assumption that a theory can be taken out of the context of its own discipline. This crucial point is made by Michael Polanyi in his discussion of science and difficulties in applied science.³³ Polanyi identifies scientists

as a "society of explorers." This society is essentially and always researching, never claiming to have found the answer but ever seeking further into truth. Thus a theory held by a society of explorers is never an end-point, a cul-de-sac, but only a means to further exploration. Commenting on Polanyi's idea, Dwayne Huebner applies its implications to education and the point at issue here. Huebner writes:

When knowledge is taken out of that society of explorers and used by other men in other occupations, it is yanked out of its self-correcting context and has the possibility of becoming dated and misused.³⁴

In other words, the user risks reifying the theory, when all the scientist meant to do was to make it an instrument for further enquiry. The difficulty in borrowing theoretical constructs for education becomes enormous in view of the fact that, because of the work of O'Shea and his contemporaries, much of present-day educational theory and practice is built upon this principle.

The final issue is implicit in the history of American education from O'Shea's time to the present day, and it relates to the education professoriate in search of an identity. The use of a technological model in education and teaching has proven to be artificial, to say the least, and, at most, it has been frustrating in the pursuit of the best education and the best method of teaching. To identify the professor of education, by implication at least, as a trainer of technicians is, therefore, an imposture.

Perhaps the key to the real identity of the education professoriate lies in the idea of John Dewey that education has no end beyond itself. In other words, the value of education and the effectiveness of education derive from principles and standards implicit in itself. The correctness of Dewey's analysis is indicated by the fact that teachers, for the most part, have resisted the technological mold. They have done so, not because of irresponsibility or perversity on their part, but perhaps because their experience in the classroom tells them that a technology of education and teaching does not work in the dynamics of the teacher-student interaction. Studies, such as that conducted by Philip Jackson, which try to understand the process of teaching in itself, indicate clearly that a technological model does not work if the teacher is to engage in worthwhile activities given the manifold variables that come into play in a classroom situation.³⁵ In other words, to view education with the "interests" (to use Habermas' term) of the strict sciences, that is, for technical control, is to frustrate the inner dynamics of the educative enterprise.

There is need, therefore, for the education professoriate to seek other modes of knowing as it searches for an identity. Michael Vincent O'Shea may be excused somewhat for laying the foundations of educational technology because he was faced with a difficult situation. Nevertheless, dialogue with this important figure in educational history points out the urgent necessity today of reevaluating the assumptions of current models of teacher education which have been inherited from O'Shea's era. Only then will the education professoriate find itself and perhaps be of service not for social efficiency or control, but for the opportunity of advancement and personal enrichment.

NOTES

1. This paper is essentially the central argument developed in the present author's doctoral dissertation, Michael Vincent O'Shea and the Professionalization of Teacher Education, University of Wisconsin, Madison, Wisconsin, 1975.
2. For this analysis of Hall's role, see Dorothy Ross, G. Stanley Hall: The Psychologist As Prophet (Chicago: University of Chicago Press, 1972), especially p. 290 ff.
3. Howard M. Jones, Francis Keppel, and Robert Ulich, "On the Conflict Between the Liberal Arts and the Schools of Education," The ACLS Newsletter, V (1954), pp. 17-38; Eugene Charles Auerbach, The Opposition to Schools of Education by Professors of the Liberal Arts - A Historical Analysis (Unpublished Doctoral Thesis, University of Southern California, 1957). There are many indications, too numerous to list here, of the opposition.
4. Benjamin Frazier, "History of the Professional Education of Teachers in the United States," National Survey of the Education of Teachers (Washington, D.C.: Government Printing Office, 1935), p. 19 ff.
5. G. W. Luckey, The Professional Training of Secondary Teachers in the United States (New York: Columbia University, 1903), pp. 104-115; William H. Payne, Contributions to the Science of Education (New York: Harper and Brothers, 1887).
6. Lawrence R. Veysey, The Emergence of the American University (Chicago: University of Chicago Press, 1965).
7. For a discussion of the impact of the Rice articles, see Lawrence A. Cremin, The Transformation of the School (New York: Vintage Books, 1964), pp. 3-8.
8. Joseph Mayer Rice, "Why Teachers Have No Professional Standing," The Forum, XXIII (1897), p. 453.
9. Ibid., pp. 460-461.
10. Ross, G. Stanley Hall, p. 279. See also Edward A. Krug, The Shaping of the American High School, 1820-1920 (Madison: University of Wisconsin Press, 1969), pp. 108-122.
11. Michael Vincent O'Shea, Education As Adjustment (New York: Longmans, Green, and Company, 1903).

12. Ibid., p. 26.
13. See Merle L. Borrowman, The Liberal and Technical in Teacher Education (New York: Teachers College, Columbia University, 1956).
14. O'Shea, Education As Adjustment, Chapter I.
15. Jacques Ellul, The Technological Society (New York: Vintage Press, 1964).
16. O'Shea, Education As Adjustment, p. 13.
17. Ibid., p. 78.
18. Ibid., p. 94.
19. Herbert Spencer, Education: Intellectual, Moral, and Physical (New York: D. Appleton and Company, 1878); Lester Frank Ward, Dynamic Sociology (New York: D. Appleton and Company, 1924).
20. O'Shea, "Education For Social Efficiency," American Journal of Sociology, Vol. XI, p. 648.
21. O'Shea, Education As Adjustment, p. 128.
22. O'Shea, "The Scope of the Normal School," Atlantic Monthly, Vol. 73, p. 813.
23. William James, Talks To Teachers (New York: Henry Holt and Company, 1899), p. 136. These lectures were delivered at Cambridge in 1892 and subsequently in other places and finally published in 1899.
24. O'Shea, "Psychology For Normal Schools," Education, Vol. 16, p. 682.
25. O'Shea, Everyday Problems in Teaching (Chicago: F. J. Drake and Company, 1912); First Steps in Child Training (Chicago: F. J. Drake and Company, 1920); The Trend of the Teens (Chicago: F. J. Drake and Company, 1920).
26. O'Shea, Social Development and Education (New York: Houghton Mifflin Company, 1909); Mental Development and Education (New York: The Macmillan Company, 1922).
27. B. A. Hinsdale, "The Study of Education in American Colleges and Universities," Educational Review, Vol. 19, p. 119.
28. Michael Vincent O'Shea to Harriet O'Shea, June 10, 1930, O'Shea Papers (State Historical Society of Wisconsin, Madison, Wisconsin).

29. Michael W. Apple, "Scientific Interests and the Nature of Educational Institutions," in William Pinar, edit., Curriculum Theorizing (Berkeley: McCutchan Publishing Corporation, 1975), p. 123.
30. The work in psychology is especially noteworthy, especially in the periodical, Human Development, edited by Klaus Riegel, who espouses a dialectical approach to studying human behavior. See also Alfred Schutz, "On the Methodology of the Social Sciences," in Collected Papers I: The Problem of Social Reality (The Hague: Martinus Nijhoff, 1967), pp. 3-96; Floyd W. Matson, The Broken Image (New York: Doubleday, 1964).
31. Boyd H. Bode, Modern Educational Theories (New York: The Macmillan Company, 1927), pp. 80-81.
32. Jurgen Habermas, Knowledge and Human Interests (Boston: Beacon Press, 1971).
33. Michael Polanyi, The Tacit Dimension (New York: Doubleday and Company, Inc., 1966).
34. Dwayne Huebner, "Implications of Psychological Thought for the Curriculum," in G. G. Unruh and R. R. Leeper, eds., Influences in Curriculum Change (Washington, D. C.: Association for Supervision and Curriculum Development, 1974), p. 29. For other problems involved in the use of psychology as a foundation science, see the insightful article by Joseph J. Schwab, "On the Corruption of Education by Psychology," The School Review, Vol. 66, pp. 168-184.
35. Philip W. Jackson, "The Way Teaching Is," in The Way Teaching Is (Washington, D. C.: Association for Supervision and Curriculum Development, 1966). See also Arno A. Bellack et. al, The Language of the Classroom (New York: Teachers College Press, 1966).

CHARLES JUDD
A DISCIPLE OF THE SCIENCE OF EDUCATION

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On January 5, 1937 Charles Judd lectured the prestigious social science faculty at the University of Chicago on the science of education and its practical applications, and he lectured with authority. He had been the senior statesman in the University of Chicago's School of Education for over 28 years. He took over the crumbling School of Education in 1909, five years after Dewey left Chicago for New York. At that time the professional study of education was done within the Department of Education, a second-rate sub-department of the Philosophy Department. Judd saw education as a subject matter worthy of advanced professional study in its own right, and through his persuasion and politics the Department of Education was in 1916 established as an autonomous unit within the Graduate School of Arts, Literature, and Science.

As Judd lectured his colleagues, his institutional efforts gave testimony to his commitment to the scientific study of education, so did his contributions through research and writing. He produced over a dozen books and three hundred monographs and journal articles, most of which were permeated with "scientific" approaches to educational issues or problems.

His book entitled Introduction to the Scientific Study of Education became the primer for thousands of education

students, and the basic text in scientific studies in education across the nation.¹ While his books and articles would provide good sources to illustrate his ideas about the science of education, his lecture on January 5, 1937 is used here to provide a flavor of Judd's thoughts and values regarding the science of education.

Judd opens his lecture with a description of the broad social and economic changes that preceded twentieth century schooling and the science of education.

After the War of 1812, when American national life began to take form and the industrial and social institutions of this country began to be independent of foreign domination, there arose, gradually but insistently, a demand for better schools and for widespread distribution of the advantages of education to all classes of the population. The period from 1830 to 1870 was one of agitation for reconstruction of the common school. . . .

After 1870 came the changes with transformed the rural, agrarian civilization of this country into one in which the population gravitated toward cities and engaged in machine industries and commerce. With these innovations in the general social system came the free public high school and the beginning of that interest in popular education which has brought into the secondary schools and colleges young people of all classes of society in numbers far in excess of those in attendance in secondary schools anywhere else in the world.

It is easy to understand why in the period from 1870 to 1900, when the social life of the United States was changing rapidly, there was a movement for educational reform which amounted to an upheaval. . . .²

According to Judd, this upheaval was preparatory for the development of scientific studies in education, for it was these very reforms that intensified the motives for research by calling into question all that had existed before.

During the first third of this century, as in the period just described by Judd, the education business was booming. The clamor for revised curricula and school organization reflected the demands placed on schools as they responded to the expanding numbers and diversity of new student populations,

and to new societal expectations. When Judd's professional career began shortly before the turn of the century, about 7 percent of American youth were in secondary schools. By the time Judd retired from the University of Chicago in 1938, about 75 percent of American youth were in secondary schools. Today, it is hard for us to imagine the impact of the demands and uncertainties that would follow such a change. How was one to understand what was happening, order it, explain it, and justify it to others?

Some felt that America and its schools were headed into a world where the old would be put out by the new, and chaos and confusion would be replaced with order, rationality, and growth. Such believers included Charles Judd and John Dale Russell. As the 1930's drew to a close, they were able to comment:

There was a time when myths and superstitions dominated the behavior of men, but that time has passed. In every sphere of life, both in the control of physical forces and in the adjustment of human relations, guiding principles are now sought through scientific research. It is no accident that during the past century a science of education has gradually developed. . . . That science should ultimately attack the problems of teaching was inevitable.³

As Judd and Russell wrote, they were not worried, as we are today, about dwindling enrollments, erosion of public confidence, or whether their work made a difference or not. They were concerned with contributing to the burgeoning enterprise of public education. Together they saw two truths. The age of superstition and myth was over, now replaced permanently by an age of rational thought and conduct. Secondly, the practical problems of teaching and school organization were being "attacked" by science.

The science of education of which the authors wrote had two components. One was an integrating faith; SCIENCE in capital letters. It was the new cosmology that was credited with cracking the chains of pre-modern thought and setting free the minds of men. This was the SCIENCE of Darwin. The other component was a utilitarian science; the science of practical problems. The science of electricity, medicine, and chemistry laboratories; this was the science of Thomas Edison.

In America, more than any other country, science was thought of and used in practical ways. For example, the first notable American scientific society bore a name that shows its utilitarian orientation, the American Philosophical Society

for Promoting Useful Knowledge, founded by Benjamin Franklin, at Philadelphia in 1743.⁴ Illustrating the same theme, Henry Ford said of Thomas Edison:

He definitely ended the distinction between the theoretical man of science and the practical man of science, so that we think of scientific discoveries in connection with their possible present or future application to the needs of man.⁵

But science was also more than a practical instrument. It was science after all that spoke the word evolution, giving it legitimacy and credence. Evolution was being used to explain and justify biological, physical, and social phenomena. Ethics, jurisprudence, economics, and history were being reformulated to incorporate the new currents of American thought. E.B. Tylor, a leading anthropologist of the day, was describing his study to be the science of culture, complete with a utilitarian theme. He felt that the science of culture was a reformer's science, one that would discover remnants present in modern life that were useless vestiges from the past; leftovers that once identified should be thrown off from society as useless baggage.⁶

Science, as the great interpreter and justifier, was being called on by earnest men and women both within and without the education professoriate to understand the changes that paraded by them. It was used to direct their activities in the absence of any other legitimizing faith.

Charles Judd's father and grandfather were Methodist missionaries, and the young Judd was raised in a devoutly religious home. As he entered Wesleyan University he fully intended to follow the family occupation. In an autobiographical sketch Judd reminisced that in his youth he was dedicated to the church, yet fascinated with the scientific laboratory in the attic of the local high school. It was his high school science teacher that gave young Charles his first shot of scientific spirit, a spirit that would overpower his early religious training and lead Judd into a career in psychology and education. Judd never lost his concern for the condition of mankind, but he chose science as an approach and a faith.⁷

Frank Freeman, a long time colleague of Judd, wrote of his friend's commitment to science:

He devoted himself to it with all the enthusiasm of a convert, and pursued it, not merely as a profession, but as the key to the solution of the problems of human life.⁸

Freeman further specified:

In the twin processes of organic evolution and social evolution, he saw the key to the explanation of the present world. Through the control of the future course of the evolution of society by means of education guided by intelligence, he saw the hope of the salvation of the human race.⁹

Freeman's words reflect Judd's dedication to and use of science as an integrating faith; science as interpreter and guide. Judd did see the science of education as part of the evolution of an orderly democratic system of public education. In addition, he found practical utility in applying science to education practice.

For Judd the most impressive evidence in support of scientific studies in education was to be found in the improvement of school practices, improvements that facilitated the evolution of democratic schooling. Judd offered a definition of the science of education in his Introduction to the Scientific Studies of Education. According to Judd, the science of education was to collect by a variety of methods information regarding the origin, development, and present form of school practices, and the social needs related to those practices. Such information was to be examined by experimental, comparative, and historical tests. The social life of which the school is a part and the nature of the children to be educated were to be studied in a similar manner. Then in light of such studies, the science of education was to suggest modifications and enlargements of school practices that were likely to promote an improved educational system.¹⁰

Judd described American schools of the 17th, 18th and early 19th centuries as primitive institutions whose curriculum and methods of instruction were determined by the conditions of a simple agrarian civilization.¹¹ School practices were a matter of habit passed on without much reflection or systematic study. With the social and educational changes already alluded to, and the advent of scientific studies in education, schools became more systematic, as did the study of schooling. By 1933, as part of President Hoover's Research Committee on Social Trends, Judd could report to the President and the American public that through the use of science "techniques have been developed which make it possible to organize education in the United States far more wisely on the basis of systematic studies than through imitation of traditional practices or through spasmodic reforms."¹² Judd went on to mention several specific areas of activity which formed a part of the science of education; the child study movement, J.M. Rice's measure-

ment movement, statistical studies, laboratory studies on learning, the school survey movement, the development of bureaus of research, and scientific studies of school curriculum.

For specific examples, we return to the lecture hall. After Judd outlined for his audience the changes in society and schooling that called forth a science of education, he presented examples of contributions made by scientific studies to the improvement of American schools. One such improvement was the substitution of opinion with measured results. Judd lectured:

Near the turn of the century new techniques of dealing with education began to appear. In 1897 J.M. Rice, editor of the Forum, measured the ability of children in a number of school systems to spell by testing them on a list of common words which he had prepared. The substitution of a definite test for mere observation was a distinct step in the direction of scientific measurement of results. Rice had been describing in the Forum his impressions of the school systems of various cities. . . . Rice came to the conclusion that his observations and his personal evaluations could not be relied on as bases for final judgments as to the merits of the various school systems. He needed objective evidence and devised the testing method of securing this objective evidence. As soon as Rice got the idea of substituting measured results of tests for personal judgment, he introduced into the field of education a concept which can be thought of as basic to all science.¹³

Judd went on to inform his audience that for forty years following Rice's pioneering work in measurement, tests were developed, especially in areas in which the abilities of pupils were easily determined -- in spelling, arithmetic, and handwriting. The area of handwriting brought additional comment from Judd.

He cited the scientific study of handwriting as another example in which science aided in replacing antiquated and unreflected habits of schooling with more rational ones. Teachers traditionally recognized one quality as essential in good handwriting, namely legibility. Handwriting instruction was tedious. Speed was neglected and the cultivation of fluent muscular co-ordination was hardly considered. As a result, students often developed cramped, clumsy movements, although the letters they formed might have been near perfect. When teachers were asked to exhibit the handwriting of their pupils,

it never occurred to them to show the pupils in action. They were interested only in the finished product as it appeared on paper. The scientific study of handwriting focused attention on muscular control and co-ordination. Judd went on to lecture.

As soon as attention was turned to movements of the muscles, it was found that pupils profit by practicing rapid movements early in their learning how to write. It required insight and a certain courage for teachers to tolerate in the early grades writing that is hardly more than a scrawl. It was discovered, however, that rapid writing compels the muscles of the arm, hand, and fingers to cooperate more fully than they do in the slow drawing of letters which was practiced in earlier times. . . . When, therefore, science turned attention away from legibility as the chief end and aim of school exercises in handwriting and led teachers to consider children's muscular co-ordination and the causes of these co-ordinations, it substituted rational understanding of the educational process for superficial observation.¹⁴

Reading instruction was given as another example. Judd felt that teachers in previous years were misled by superficial indication, as in the case of handwriting. Teachers were satisfied if pupils were able to pronounce the words which the printed page presented to their eyes. Oral reading was the goal of all school instruction. However, scientific investigations discovered that the behavior of an individual's eyes during reading can indicate more accurately what goes on in a reader's mind than can be determined by listening to the pronunciation of words. Judd described the process.

The eyes of a reader can be photographed as they move along a line of printed matter. The movements of the eyes are not continuous. The eyes fixate successive points and make rapid movements between the points fixated. Each time the eyes pause the mind grasps more or less fully the meaning of the group of letters fixated. The length of time during which the eyes pause at a given point gives clear indication of the difficulty of the inner process of recognition. . . . The number of pauses which the eyes of an individual make during the reading of a line of printed matter is as significant as the length of the pauses. The greater the number of pauses, the greater the difficulty the reader is experiencing.¹⁵

The device for photographing eye movements was developed by W. F. Dearborn, on the faculty of the School of Education at the University of Chicago. The machine was used there by faculty and graduate students. Through such photographic methods, teachers became aware of the distinction between oral and silent reading, and began special training in silent reading.¹⁶ The emphasis on oral reading was lessened, and more attention was paid to silent reading, in which speed and comprehension were emphasized.

The three examples presented in Judd's lecture illustrate the types of changes that were thought to be contributions made by the science of education to improving American schooling. Today, they might appear rudimentary or mundane. But they were significant during Judd's time, and the source of enthusiasm. To consider them insignificant would be to commit the historical flaw of presentism on our part. In effect, we would be judging yesterday's actions on the basis of what is known today.

Today, many hasten to criticize the advocates of the science of education, feeling that such science led to a technocratic educational system that channeled and sorted American youth to serve the status quo. Certainly, the forces that shaped the selective character of American schooling went beyond scientific studies.

We admit with some guilt that schools have not become instruments of broad social reform. This is so despite our ardent wishes, or the best hopes and efforts of earlier reform minded men and women who saw science as a way to interpret the events of the day and direct their activities.

Charles Judd accepted the science of education as an integrative belief or faith, and as a utilitarian means toward improving school practices. He not only accepted it, but actively sought to pass his belief on to others through his research, writing, teaching, and administrative activities. He was indeed a disciple of the science of education.

Although Judd was dedicated to the scientific approach to education, he did see some limits to his belief. We return to his lecture.

The science of education is in the making; it is not complete. The phenomena seen in every classroom are far more complex than the phenomena with which the natural sciences deal. They are, indeed, among the most complex phenomena in the universe. The best that can be said about the science of education is that it has developed certain techniques by which it can throw light on aspects of

education that were formerly obscure and by which it can decide in some cases between contradictory methods of instruction.

The science of education, like all the sciences which deal with human nature, is subject to marked limitations. If it is impossible for medicine to deal effectively with certain maladies and if the science of government cannot forecast the trends that politics will take in crucial instances, the science of education can be consoled when it finds that it has not solved many of the problems of teaching. Limitations such as prevent all the social sciences from dealing finally with their problems need not be accepted, however, and should not be accepted, as barring the way to highly productive investigations. Partial scientific solutions of difficulties are far better than reliance on opinion, however experienced.¹⁷

Despite such limits, Judd was confident enough in its progress to write in his Introduction to the Scientific Study of Education;

A complete transformation of the method of approaching school problems has come about in recent years. The time was when opinion, especially if it was backed by even a little practical experience, was urged as sufficient reason for all kinds of school practices. Today it is only the rashly ignorant who talk about education or aim to influence actual school operation without informing themselves through a study of known or recorded facts. A host of practical school officers and special students of school problems have carried out laborious investigations and have created a technical literature which promises to reach every phase of school work.¹⁸

That scientific studies would reach into every area of American schooling was part of Judd's faith. The proliferation of systematic studies of educational practices during Judd's day was partial fulfillment of that faith. While those studies played a part in revising elementary and secondary curriculum and methods of instruction and helped show the way for new forms of school organization, including the junior high schools and junior colleges, one would be hard pressed to agree with Judd that such studies replaced opinion as an important force in education policy and practice.

Judd's optimism should be viewed in relation to its historical context. SCIENCE was interpreting the changing world as an evolving, ever improving world, and the practical applications of scientific investigation were providing concrete examples that improvement was at hand. In that context, Judd became a true believer in science, and one of its best known disciples in education.

When American schools were coping with an avalanche of new and different students during the first third of this century, many educational professionals were struggling with the problems of creating schooling systems that could accommodate the increasing numbers and diversity. Scientific studies received a great degree of attention in their efforts, and that attention was rewarded by some needed practical improvements. Such a fuss would not have been necessary if secondary schooling had retained its elitist nature of the 19th century.

Now with school systems well established, maybe too well established, across the country, attention has turned to several questions of equity within those schools. The science of education has been criticized for helping to build public schools into bureaucracies that perpetuate the status quo. Undoubtedly, sins were committed in the name of science, but science is not the only known sinner.

The measurement movement, a much chided part of the science of education, did not develop in education alone. Statistics and new means of measurement were being applied in institutions throughout the American culture during the first third of this century as it was being reshaped into a urban, industrialized society. The use of newly developed statistical techniques in emerging American institutions is chronicled in a section on statistical communities in Daniel Boorstin's The Americans: The Democratic Experience.

Judd's dedication to a scientific approach to educational problems greatly influenced his views regarding teacher education, the preparation, and the role of the education professoriate.

Judd built a distinguished faculty at the University of Chicago and produced many of the leading members of the education professoriate, all with a commitment to scientific studies. Among the School's graduates under Judd's direction were Frank Freeman, Dean of Education at the University of California; William Gray and Guy Buswell, of the University of Chicago; William Brownell, Duke University; Homer Rainey, President of the University of Texas; and William Burton of

Harvard. Other alumni during Judd's tenure include George S. Counts, Newton Edwards, Carter V. Good, Leonard V. Koos, Walter S. Monroe, John Dale Russell, William Reavis, Herman Richey, and Ralph Tyler.¹⁹

By the time of Judd's retirement in 1938, there were fifteen full professors in the Department of Education. Of these two came to Chicago with Judd, three others had been trained elsewhere, but ten had received their degrees in the Department itself.²⁰ The orientation of this faculty was the orientation of its director, namely that "scientific facts about school practices and results, secured through the use of historical, statistical, and experimental methods, can be put into a form which is as specific and exact as the professional information given in schools of medicine or engineering."²¹

Judd expected his faculty to have the same conception of the professorial role as he had himself. He furnished a model for them to emulate. Always busy, he taught a full schedule of classes, governed the school and department of education, guided doctoral students, engaged in research, published widely, edited educational journals, spoke frequently before diverse audiences, and served on many of the most important local, regional and national committees, associations, councils, and commissions.

The detailed nature of Judd's impact on the education faculty at the University of Chicago and on the professoriate that were trained there, would have to be determined by studying their research, publication, and service activities. This would be a worthy project, but one not taken on at this time. Suffice it to note that the School of Education at the University of Chicago was reputed to be one of the leading centers of the scientific study of education.

As Judd was restructuring and building the School of Education at the University of Chicago to reflect his views, and as his colleagues and graduate students made their contributions to their respective fields, the science of education was spreading and the education professoriate was proliferating beyond the campus at Chicago.

Newton Edwards and Herman Richey argue that the development of sophisticated studies in the science of education played a significant role in the acceptance into universities of teacher education and professional educational research. According to these authors, prior to systematic studies of education, university administrators and faculties did not think that the preparation of teachers involved professional work of collegiate rank or that the problems of schooling were worth of university study. Edwards and Richey wrote:

The developing science of education forced its way into the college and university. In 1890, there were less than a dozen chairs of education or pedagogy in higher institutions. . . . By 1920, more than four hundred colleges and universities were providing some kind of program in education, and, in each instance, the program reflected the findings of the new science. Expansion since has resulted in the organization, within practically all universities, of departments or schools of education of standing equal to the other professional divisions, colleges, and schools.²²

In this view, the education professoriate grew up with the spread of scientific studies of educational problems.

There was a symbiosis, but institutions do have their demands. With regard to educational psychology, one of the earliest and most fundamental contributors to scientific studies in education, Arthur Powell suggests that in its search for academic respectability within the university, educational psychology became isolated from the concerns of the educational profession and the broader movements in psychology. He illustrates his point by reporting that James Russell, the Dean of Teachers College, Columbia University, was never really convinced that Thorndike's research would improve education, but that he appreciated the prestige that Thorndike brought to the College.²³

Those of us who are grateful that the professional study of education is housed in universities, have to acknowledge our debt to the scientific movement in education, and likewise be aware of the institutional pressure to make our work "scientific." In this regard, we face two challenges.

First, our studies need to be careful and systematic without drawing away from a concern for the educational problems of the day. Our work can be sophisticated, without being esoteric or isolated. Judd provides an example through his application of psychological research to the problems of schooling.²⁴

Second, we need to resist a too narrow view of American schooling. As pointed out in other papers in this symposium, science is a means of inquiry. It guides our study of education, but does not tell us the ultimate aims sought or the value of the ends reached. Science tends to focus on technique, and not necessarily on the social aims or consequences of schooling. For example, in Judd's report to President Hoover on the problems of education in America, he fails to come to grips with the economic and social disparities in the

United States present in the 1930's and their impact on schooling. Those very conditions, however, motivated much of the work done by George S. Counts, one of Judd's students. Similar tendencies continue today. Only a small portion of our studies carefully consider broad social conditions and concerns that affect the very meaning of education and give legitimacy to what goes on in classrooms. Although Judd's description of what a science of education ought to be includes those types of studies, they have been cultivated by only a small group of education professors and social scientists. They are part of our inheritance from the science of education that has yet to bloom.

NOTES

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4. Steven F. Mason, A History of the Sciences (New York: Collier Books, 1962), p. 590.
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6. Morton White, Social Thought in America: The Revolt against Formalism (Boston: Beacon Press, 1957), pp. 17-18.
7. Charles H. Judd, "Charles H. Judd," History of Psychology in Autobiography. Volume two, edited by Carl Murchison (Worcester, Massachusetts: Clark University, 1932), p. 207.
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10. Charles H. Judd, Introduction to the Scientific Study of Education (Boston: Ginn and Company, 1918) pp. 305-306.
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12. Charles Judd, Problems of Education in the United States (New York: McGraw-Hill, 1933), p. 178.
13. Charles Judd, "The Science of Education and Its Practical Applications," p. 6.
14. Ibid., pp. 12-13.
15. Ibid., pp. 15-16.

16. Charles Judd, "Charles H. Judd," p. 230.
17. Charles Judd, "The Science of Education and Its Practical Applications," pp. 5-6.
18. Charles Judd, Introduction to the Scientific Study of Education, p. 299.
19. Douglas E. Scates, "Judd and the Scientific Study of Education," pp. 22-23.
20. Frank Freeman, "Charles Hubbard Judd, 1973-1947," p. 62.
21. William S. Gray, "Charles Hubbard Judd as a Pioneer in the Development of Professional and Graduate Study in Education," The University of Chicago Archives, Charles H. Judd Biographical Files (A paper given at the dedication of Judd Hall, University of Chicago, April 15, 1948), p. 36.
22. Newton Edwards and Herman Richey, The Schools in the American Social Order: The Dynamics of American Education (New York: Houghton Mifflin, 1947), p. 802.
23. Arthur Powell, "Speculations on the Early Impact of Schools of Education on Educational Psychology," History of Education Quarterly, Vol. 11 (1971), p. 407.
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'SCIENCE OF EDUCATION' MUST BECOME A HOUSEHOLD WORD--
A TASK FOR THE PROFESSORiate

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The above title came to me after having labored long over several drafts for the commentary I felt compelled to write on these very fine historical studies. Professors Robarts, Tafano, and Van Fleet have capably instructed us on the historical quest for a science of education. When first reading them my feeling was that 'a science of education' is an anachronism. Why did I have that feeling and opinion? Probably because of my interest in making "philosophical investigation" more popular among education students; also very likely because of the plethora of diverse specialities and several "sciences for education" which dominate the college of education scene. But on the morning of the day I had intended to give my "final draft" to the typist, the above title came to me. Our historians (blessed with the editorial encouragement of Erwin Johanningmeier) have addressed their studies to the education professoriate. That abstraction used to annoy me, but now I accept it as a straight-forward descriptive term. "The education professoriate" designates the community of education professors who share an inordinate commitment to pursue optimal clarity about and positive action on their common problems. Why address anything to the professoriate? In order for the members to be blessed with more and more good writings? Or do we say something to the professoriate in order that it, in its collective action, can do an im-

pressive and needed job in the education of educators? It is an analytic claim that good history offers enlightened perspective on the present. I hope that my remarks shall demonstrate that these historical studies are more than nicely written and valid history but that they are seminal in that they point to a sharply focused task for the professoriate.

The present writer has had "science" with his study of education. How else explain his writing in this conventional but stilted style of detached objectivity--referring to himself as if he were viewing himself from an outside vantage point providing some sort of pure observational focus? Yes, he has had science--he has really had it; so much so that it grossly delayed his seeking expertise in other valid methods of inquiry. This is not the occasion to elaborate "Pursuit of Educational Truth 499", but I want symbolically to affirm my interest in all those forms of legitimate inquiry which are not "strictly scientific". I am Jim Merritt--one member of the education professoriate--and I want to relate warmly and effectively with my colleagues and students in education. This is my existential declaration, and you'll see more later on why I bring in this existential note. It is my contention that the education professoriate needs a proper balance of its formal scholarship and science with its attention to existential reality.

What is a valid historical judgment on the professoriate's involvement with science? I contend: It has overdone it! And it has tolerated a schizophrenia among teachers about it. It has ignored William James's caution that teachers cannot strictly be scientists. The evidence for this is the inordinate attention to statistical studies and experimental psychology at all levels of college study of education under the rubric of "educational research". While the religion of the Fundamentalist Christian has been "Christ is the answer", by analogy, the standard religion of the education professor has been "Science is the answer." The professoriate has thrust certain ambiguous values about "being scientific" onto teachers but while doing so has denied them adequate logical training in the philosophy of science.

In the era of O'Shea and Judd, the demand for a science of education was a banner of hope symbolizing the expectation that cadres of teachers would become expertly knowledgeable in the psychology of learning and human development to the end that such knowledge would effectively condition their professional functions. Science was expected to give them the means for acting wisely. In hindsight, we can see that their model was unduly simplistic.

But the demand for a science of education which in theory shall set teachers free to do what is right is not dead. Professor F. Ray McKenna makes such a demand in a recent article in PHI DELTA KAPPAN¹ in which he invokes the authority of Piaget to contend (1) there is, sadly, no science of education, and (2) that such an entity is manifestly necessary. McKenna further conjectures on how it shall come into being: a science of education shall become a household word largely because of public outcry at the fact of its scandalous absence. (*Italics--my paraphrasing of McKenna.*) About this conjecture, it is interesting to note that the editors of the EDUCATION INDEX in which McKenna's article is listed do not index it under any specialized topical listing of the sort: "Science of education--public demand for". The standard author listing was all I could find.

I assigned McKenna's article to a group of foundational students, and we got into polemics of this sort: "Look!" I contended, "You do want an edge, don't you, on the intense competition in the job market? So why don't you take on very seriously, the task of formulating your own science of education? You've been told about the importance of having your own philosophy of education. So why not go it one better by preparing your own science of education? Beat the competition! Demonstrate a superior identity with both science and philosophy as your two basic foundations in education." I said something of this sort; the foregoing is a purified version based on what I actually remember saying and what, now in retrospect, I would have wanted to say.

Our historians, Robarts, et al., have helped me see more clearly McKenna's claim that 'science of education' can very practically live in the lexicon of education students. The error on the part of the education professoriate has been to assume that education students shall learn to be essentially "consumers of educational research" (and that concept is very popular on my campus). "Products of educational research" mean largely the conclusions of the work of experimental psychologists. I lapse into doggerel:

Oh! To be a consumer!
Now that science has given such
Technological goodies.

As in a totalitarian state, the religion of the professional educator becomes in harmony with the religion of a materialistic society--a society ruled largely by the needs of the military, industrial complex.

¹ "Piaget's Complaint--and Mine: Why is There No Science of Education?" KAPPAN, Feb. 1976, pp. 405-409.

"But, Jim" I can imagine my readers saying: "Do you really have anything better to offer? Omitting your polemics, isn't it valid that the new student of education must learn his/her foundational content largely through didactics? There is so much that scientists of education have determined; we cannot take time for new students to rediscover the wheel." Whether or not you accept this as a valid response, I offer this in retort: Didactics can be viewed as essentially for the advanced student of education; their use with the new student of education must be judiciously combined with heuristics. Rather than give the new student of education a body of impressive conclusions from the various sciences for educators, give the student philosophical guidance in formulating his/her own science of education. "Science" refers both to (a) methods of inquiry and testing, and to (b) organized and systematized knowledge. (See Dewey, DEMOCRACY AND EDUCATION, p. 190, paper.) Surely, both those senses apply to questions of this sort.

- a. What is one or more reliable definitions of teaching?
- b. What diverse meaning does the term 'psychology' carry?
- c. What is one valid doctrine on knowing success as a teacher?
- d. What are decisional options for judging that "learning has occurred"?
- e. What can the term 'intelligence' mean, especially when we hear so confidently expressed the doctrine that 'intelligence' is essentially what intelligence tests measure?

Questions such as these are for a science of education--not questions essentially in the sciences for education--the traditional examples: psychology, sociology, and statistics. I offer my questions as examples which are particularly prone to heuristical treatment. I find this relevant to Dewey's assertion (also in DEMOCRACY AND EDUCATION) that one of the weightiest problems for philosophy of education is to find the proper balancing of formal and informal education. By analogy, one of the weightiest problems for the professoriate of education is to find the best balancing of didactic and heuristic teaching.

McKenna's conjecture about a science of education coming into being largely in response to public demand isn't as naive as my previous commentary might suggest. By analogy, how did psychology become "the science of psychology?" William James worked for fourteen years on the subject and concluded in a

a final paragraph of BRIEFER COURSE that there is no science of psychology--only the hope of such a science. Yet, in the twentieth century popular lexicon there is a science of psychology--James's learned reservations notwithstanding. Why does the science of psychology so unquestionably exist? I suggest the irreverent answer that the public has accepted the assertions of professional psychologists that it is really there. (Little child in The Emperor's New Clothes, we need you!) And the "power brokers" in teacher education have largely taken their philosophy from the public philosophy--so much so that they cannot focus on the greater relevance of science (and philosophy) of education. ("Yes, Virginia, there is a science for education but its true name is Ed Psyche; we know it so well we use its nick-name." Apologies to Harry Broudy.)

All this brings up the old question of the legitimacy of education as an autonomous discipline of inquiry. Let us express gratitude to Professors John Walton, Israel Scheffler, and Mark Belth who have written so well on this topic. If education does not have its unique integrity as a focus for academic study then there is the danger that professionals in education shall forever think of themselves as second-class members of Academe. While on sabbatical in England I was asked what I did in America. I said I was a professor of education. "Oh, I see, Applied Psychology" was the knowing response. If education is not a discipline in itself then there is the danger that the knowledge of the education professional shall be viewed essentially as rag-tag bits of discrete selections from the "respectable sciences". At present the "power brokers" in NCATE and AACTE do not accept education as an autonomous discipline. In consequence, doctoral candidates (for one of the more honestly described degrees in Academe: Doctor of Education) hie themselves to the doors of statisticians and psychologists because they have gotten the word that there is where the "real and basic sciences" reside.

Essentially what is science? The answer I learned in graduate school is self-debilitating activity which, if one is among the more fortunate, leads to the reduction of important questions to statistical comparisons. Strangely, one finds Peirce, James, and Dewey writing so much about science with no reference to statistical comparisons. Indeed, science has given our society some impressive statistical comparisons. (Smoking is a leading cause of cancer!) But science has its varieties of non-statistical contexts: there is the science of knowing (i.e., epistemology); there is phenomenology--the science of studying consciousness; classroom management can be discussed as science; and I see on my shelf a book on the science of training the dog. (Some of the methods in the latter really work even for my irascible beast.)

The difficulty is not only that the "power brokers" in teacher education do not accept education as an autonomous discipline with its unique content of science but that Academe in general looks with extreme skepticism on such a claim. And sadly, we must note, that education professors largely do not see the name of their very degree as designating an autonomous field of inquiry. The specialists who are preparing new doctorates of education largely do not accept the proposition that education is a unique field of study having its common content and problems. Professors of education like others in Academe, are hooked on the concept of "inter-disciplinary study". Invoke that popular shibboleth in the right sort of context and note the knowing nods of approval. The popularity of this concept among education professors can be traced to the failure of the professoriate to know its basic functions and common content. The failure is that teacher education has been endemically methodological rather than foundational. Imagine, if you can, a physicist calling for the inter-disciplinary study of physics! Yet educators are prone to look upon the sciences outside of education as providing the basic content for their discipline. Recently, I was present in a faculty meeting of Foundations professors, no less, who argued strongly for the "inter-disciplinary study of education" becoming choice rhetoric in a brochure announcing a Master's in Education Foundations!

Of course, the content of all disciplines must be supported with content from allied disciplines. Psychologists, historians, and sociologists shall necessarily continue to find much to illumine educative experience. But their findings should be viewed with reservation unless they demonstrate their identity as students of education. How shall we know that a writer has such an identity? It shall be through evidence that the investigator has known educative experience directly and he/she is expert in the empirical reporting of such rather than taking one's conceptions of education largely from the common culture. (You can further appreciate my point if you note the triteness of concrete examples of schooling experience appearing in otherwise learned philosophical treatises.)

The professoriate, acting largely through the political actions of the Foundational Societies (meaning what contemporary AACTE and NCATE Proceedings refer to as "the learned societies"), must come out strongly for "competencies" such as demonstrating expertise with philosophy of science. Science, in the education of the professional educator, must be introduced initially through its philosophy; otherwise how shall the educator know which of the congeries of scientific findings one should judge to be relevant to one's particular situation in improving the arts of teaching and learning? This is not to ask neophyte students to master the works of esoteric writers such as Maccia, Nash, Popp, and Vandenberg. (I take umbrage at Maccia's and Popp's proposal to popularize "educology"; let's stay with common sense language avoiding neologisms as much as possible.)

I want education students to master such straight-forward writings on science as those of Dewey and James and Peirce. If we have cadres of such knowledgeable students then "the science of education" (implying no neglect of philosophy of education) shall, like the sciences of medicine, nutrition, agriculture and chemistry, become household words in the American popular culture.

Earlier in this paper, I commented on what I take as the professoriate's need to achieve a certain balancing of science and scholarship with "existentiality". I want to offer something positive on this point. In their generations, O'Shea and Judd enunciated doctrines on a science of education becoming foundational preparation for educators. We contemporaries in the latter 1970's and early 1980's must try to agree on comparable doctrines. In this spirit I shall comment on my own existential philosophy of science in education. First some pragmatic notes: We lose too many potentially excellent educators because of their failure in and contempt for certain types of empirical studies which predominate in colleges of education. So much attention is given to the attaining of super-precise statistical accuracy that there is not time for the development of competencies in the areas of value-judgment and theoretical choice. Our schools are far less effective than they might be because of basic policy errors of the power brokers in teacher education. One of my dean friends has become avidly involved with "clinical experiences with multi-cultural education". I said to him, "John (that's his real name), when are you guys going to become comparably involved with 'logical and theoretical expertise'?" In response, he smiles graciously as if to say, "Jim, I know it's an absurd world, but one has to work with the existing mores of those in power."

My thesis is that the power brokers in NCATE and AACTE must be convinced that foundational study should include expertise in formulating both philosophy of science and science of education. Every literate person has certain primitive notions about science. The culture teaches him what science is with gross inaccuracy. The culture "teaches" that no one can be "truly scientific" unless he or she has endured years of apprenticeship in the guild and has achieved a handsome grant which is federally-funded. The challenge for the education professoriate is to teach education students "to be scientific" with the limited data and theories one has right at hand in the immediate environment. And it is my thesis that the student of education can learn to develop one's scientific expertise in the process of formulating one's own content for one's personal science of education. I feel confident that this does describe the motives of many education professors. Should not the new student of education come to the university environment expecting to become expert in describing one's own "experience with education?" Everyone has

had education, but most are grossly inept in describing just what one has had. To be a scientist with one's own experience with education means to commit oneself to extraordinary efforts of precise recording of "relevant" memories and other data which feel pertinent. A scientist makes deliberate effort to "be open-minded" about the doctrines and values he or she holds. A scientist makes deliberate judgmental conjectures and careful definitions of "the problem." (The careful defining of "the problem" is STEP NUMBER THREE for Dewey in DEMOCRACY AND EDUCATION.) Of course, my words indicate I have taken Dewey's writings on "scientific method" seriously. What might be new to some readers is my suggestion that whatever is valid in Dewey on science be put into the context of developing expertise in the philosophy of science in education.

I modestly suggest that expertise in the philosophy of science of education can be taught and learned in an environment which is characterized by certain basic existential qualities. The new student of education need learn that all his or her involvements with "educative interest" can be viewed in the context of legitimate scientific and philosophical inquiry. One's memories and impressions of the history one had in high school can provide just as significant scientific data for this particular investigator as can standard error of the mean for the researcher measuring logical competency in a population of ten thousand ten-year-olds. Hence, a first task for the neophyte philosopher of science of education is to identify his or her data about his educative involvement. For such a task the student of education needs the persisting encouragement of professors who believe that the student must find personal identity as a scientist, as a theorist, and as a philosopher. When he or she finds personal identity with science, theory, and philosophy he or she can then work efficiently with the writings of seminal philosophers and scientists. It is a matter of finding one's own positive existentiality with science and theory. In my own pursuit of this I have found "the journal method" to work very well. By this I mean that the student of education writes regularly his/her thoughts, feelings, theorizings, precise and imprecise observations to which the professor responds with "appropriate dialogue". It is time-consuming but it is immensely rewarding.

My earlier titles for this commentary were in terms of: "Here is some darn good history, but dear colleagues in the professoriate, what is the pragmatic bottom line?" Well, dear colleagues, especially members of the Society of Professors of Education--like the bumper sticker says--I FOUND IT. If my new religion runs into doctrinal error you'll have to pray for me--or better yet reason with me and show me the better truth. In my present emotion I feel like confronting my local

Board of Education saying it is an unholy crime that you hire teachers who have not demonstrated their competencies in formulating their own science of education. But I'll desist from such quixotic gestures until I see if anyone in the Society of Professors of Education thinks I'm on the right track. Again, to Messrs Robarts, Tufano, and Van Fleet and also to Erv Johanningmeier, I say thank you for some very seminal history. And also gratitude to Ray McKenna for an idea which has lain dormant too long.

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